Water research – LOOKING AT THE NEXT 40 YEARS

As the Water Research Commission (WRC) enters is 41st year, independent consultant Barbara Schreiner looks at the challenges facing the Commission – and the wider South African water community – in the coming decades.

The WRC has been commissioning research to serve the needs of the water sector for 40 years – since it came into being in 1971. That body of knowledge has served to bring the sector to where it is today, and has served to keep South Africa at the cutting edge of water management.

With the WRC having celebrated its 40-year existence through a special conference, one can ask what can be said about research in the next 40 years, and what some of the key challenges of the next 40 years might be. In looking forward, we can best start with where we are now, and what we know now.

Over the last decade, there have been major changes in the water sector globally, driven, amongst other things, by the global recognition of the impacts of climate change on water, and the need to take an adaptation focus in the water sector, rather than the mitigation focus of the energy sector. At the same time, increased water scarcity and heightened public awareness of the value of water at all levels in society have meant that large corporate business has recognised the significant water risks that they face. As a result, they have stepped into the water arena to address the risks they are facing, with impacts on how water is viewed and managed in the corporate sector.

In South Africa, heightened public awareness around water issues has resulted in unions threatening to strike around water resource management issues, and the Minister of Water Affairs being charged with failure to protect water security and failure to effectively implement the National Water Act. Within the water research arena in South Africa, we have both remarkable opportunities and significant challenges.

Firstly, we have a strong WRC, envied by many in the rest of the world. We have decades of excellent research, and some world-class researchers. Nonetheless, we also face massive challenges in implementation despite the years of excellent research. The country faces, as everyone in the water sector knows, limited water resources, deteriorating water quality, major water service delivery achievements but poor quality construction, operation and maintenance and revenue generation.

These water sector challenges are compounded by the broader challenges of high levels of joblessness, poverty and inequality, jobless growth and the impacts of a global economic downturn. All this could make one despair or panic – or, alternatively, see it as a challenge to the considerable innovative intellectual capacity in South Africa to find new ways to address our water challenges – an opportunity for us to shine, to do things differently, to show the world the way forward.

Looking at it as a challenge in this way, one must ask the question: How does one take the good that currently exists in the water research sector and make it great, so that it really serves the people of South Africa, and the world more broadly. If we look forward over the next few decades, there is much that we cannot foresee, but some things are extremely likely. We are almost certain to see increasing complexity, increasing pressure on our limited water resources in relation to both quality and quantity, a changing availability of resources due to climate change, changes in the skills needed and the skills available, an increasing population and an increasingly urbanised population, increasing regional economic integration, an increasing rate of change, an increase in the proportion of the population classed as middle class with increased consumption patterns and resource use, and economic growth and diversification, possibly into areas that we can hardly imagine now.

What does this mean for the water sector? Limited resources will have to go further, services will have to be provided in a more sustainable way, and the water sector, including the research community, will have to work much, much smarter!

What then are the implications for water research as we move forward?

Some things will stay the same, such as the need for good science, based on good data. Maintaining and obtaining good data in South Africa is a challenge. Relative to many of our SADC counterparts, our data is good, but is it as good as we can make it? Is it getting better, or is it getting poorer?

Papers presented at the WRC 40-year celebratory conference show how the monitoring network is deteriorating, rather than improving. We will need to find effective, innovative and reliable ways to obtain good data to underpin research and decision making. This is an area that requires improvements in management, funding, and technology.

There is a call for stronger and more innovative partnerships between researchers and government, and we need to bring civil society and the private sector into these partnerships as well. We will need to combine the intellectual capability of all of these sectors into finding innovative and appropriate solutions to our challenges. There is also a need for stronger alignment between water research, research in the broader science community and research in the economic development field, so that our research can be integrated into the economic development challenges and solutions for the country.

Systems thinking, finding ways to solve 'wicked' problems, interdisciplinary and transdisciplinary research will continue to develop in importance in water research, bringing together social scientists, bio-physical scientists, economists, grassroots researchers, and indigenous knowledge to find answers.

Of great importance is that the water sector moves beyond a focus on methodologies to a focus on supporting implementation, but not to the exclusion of long-term and blue-sky thinking. We need able minds that are looking at how to fix the problems of today and next week, but we also need able minds to be looking down the line at how to respond to issues that we have not even identified yet. We must encourage a structured scanning of the environment to pick up new challenges while they are still far away, on the horizon, not already burning on our laps.

The focus on implementation and the huge challenges on the ground mean that we must increase action research, research that creates change through the process of research. The increasing need for adaptability and the ability to manage and understand complexity and change require that the very way we do research, the type of research and the results of the research heighten our adaptive capacity as a country, whether as decision makers or household gardeners. The other side of this coin is the need for a much greater understanding of risk and how to manage risk in a context of increasing uncertainty.

We will want to see more effort going into the development of innovative technologies, ones that might be able to create jobs and bring in foreign exchange, while helping to manage our increasing water challenges. Finally, the water sector needs to support long-term research that spans decades, in order to provide the necessary knowledge and understanding of hydrological, social, ecological and other processes that operate over long-term horizons.

Looking at the future of water research in this manner raises the question of who the research serves, and how to get the results of the research to them. The purpose of research is to change the world, and to do so it must be channelled out into the world where it can be applied, by public officials, water users, stakeholders, and members of the public.

The next 40 years will bring unimaginable opportunities for using communication technology to get information to people who need it. If regimes can be overthrown through the use of social-networking technology, surely the water sector can be revolutionised in this manner as well?

Finally, there is a need for the ongoing transformation of the research community to represent the demographics of South Africa. The challenges that the country faces in relation to science and maths education in particular, but education more generally, raise questions about how the water research community engages with these education challenges, not just at the tertiary level but at all levels, to ensure that we are breeding the young scientists that we need.

In closing, we must note that water research takes place in a broader context, both the current context, and a planned future context. In the New Growth Path, the government has identified the creation of jobs as critical, and they have identified the following sectors of the economy for job creation: infrastructure, the agricultural value chain, the mining value chain, the green economy, certain manufacturing sectors, and tourism and certain high-level services.

All of these require water and have water-related implications, and research needs to support these national objectives, within the context of the Constitution that calls for socially justifiable economic development, but also calls for the protection of the environment. In doing so, we must put people at the centre of the research agenda. Let us remember that there are no people without water; there would be no water problems without people; there can be no knowledge without people; and there can only be solutions to human-induced water problems, through people.

We need to continually get people together, virtually or face-to-face, to create new knowledge and new ideas. Bringing together these things, we may be able to achieve well-researched knowledge to inform our endeavours so that we can envision who we are, what we can be, and how to get there.

- This editorial first appeared in the WRC 40-Year Celebration Special Edition 2011 of *Water SA* Vol 37, No 5. ❑